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THE LICENSING OF OPERATORS FOR WATER PURIFICATION PLANTS IN THE STATE OF NEW JERSEY¹

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The state of New Jersey has been one of the pioneer states in the work of water purification, largely on account of the necessity of providing extensive purification for surface waters taken from densely populated watersheds. The extreme case exists on one watershed where the average population is nearly 4000 persons per square mile.

With such conditions it has been necessary to require municipalities or companies to place in charge of their purification plants men who have had considerable experience and training in their work, or to educate the men in the essential principles of water treatment, allowing them to learn the details of their respective plants by experience. Formerly the latter method had to be relied upon entirely, but it later became customary for municipalities to cut down expenses by hiring unskilled labor, which resulted in the discharge of water unfit for potable purposes.

This led to the drawing up of a law which was passed on February 9, 1918, and which is known as Chapter 23 of the Pamphlet Laws of 1918 of the State of New Jersey, relative to the examination and licensing of operators, printed as an appendix to this paper. This act authorizes the State Department of Health to examine prospective operators and to issue a license, providing the examination of the applicant proves the latter to be capable of performing those duties which will be required of him. The nature, place and grading of the examinations are intrusted to the discretion of the Department.

It is further provided that every purification plant must have a licensed operator, but that licenses should be issued to all operators

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holding their positions prior to the time of the passage of the act upon proper certification by the municipal officer, corporation or individual, under whom the operator works. The Department is given the authority to revoke a license when, upon the operator being given a hearing he shall be judged incompetent to manage the plant in his charge, or shall have been wilfully negligent in his duty, or shall have disregarded or disobeyed the rules or regulations of the Department. There is provided a penalty of \$10 for each day on which the violation occurs. It is further provided under the act that either before or after the institution of penal proceedings the Department may proceed to prohibit such violations by injunction, and to obtain such other or further relief as the Court may direct.

Following the passage of the act a set of rules and regulations was issued by the Department, outlining briefly the method of examination and grades of operators. An abstract of this follows:

There shall be three classes of licenses issued to persons examined as superintendents or operators of water treatment works:

A First Class, or Superintendent's, License shall be issued only to those persons having the qualifications and knowledge necessary for the satisfactory supervision of the operation of water treatment works, including the following processes: Sedimentation, coagulation, filtration, and disinfection; and for making the standard tests, both chemical and bacteriological, necessary for testing and controlling the efficiency of all the various processes used in water treatment works; and informed in general as to the mechanical equipment and devices used in water treatment works.

A Second Class Operator's License shall be issued only to those persons having the qualifications and knowledge required in order to satisfactorily operate or control one or more of the processes required for a Superintendent's License; and having knowledge sufficient for the making of the routine standard tests, both chemical and bacteriological, for testing and controlling the efficiency of the various processes utilized in water treatment works which he expects to operate.

A Third Class Operator's License shall be issued only to those persons having the qualifications and knowledge required in order to satisfactorily operate or control one or more of the processes not covered in the First Class License and the Second Class License. This class applies only to those operators having charge of a plant at which the removal of iron or disinfection is the only process of treatment.

As provided by this act there were 65 licenses issued without examination, and 14 licenses have been issued upon examination. These do not quite represent the total number of plants, as in a few cases it was necessary to issue more than one license.

In each case possible, representatives of the Department have spent from one to four days at the plant with the applicant for examination, and have drilled them in the routine fundamentals as well as in some of the more involved chemical and bacteriological tests. In other cases the applicants have come to the offices of the Department and have spent one or two days going over the operation of the plant from every standpoint possible without actually being at the plant in question. The principal points in each of several recognized standard books on water purification were also taken up. In some cases the applicant has been taken over to the Trenton filtration plant, and has been shown plant operation on a large scale. The results of showing operators a modern, well maintained and well operated plant have been noticable. In most cases both written and oral examinations have been given.

The benefits derived from this act are, of course, more or less intangible in aspect, but the greatest advantages seem to be in more personal interest in plant operation being taken by the operator (thus resulting in greater efficiency) and in the greater coöperation obtained between the operator and the Department. Frequently a municipality would in the past pay no attention to instructions issued as to changes in operation of a plant, but a licensed operator who is always at a plant knows the necessity of changes at times, and, realizing that his position may be at stake, will force the authorities to listen to his demands for changes or improvements. This is more often true of the men who have had to take examinations than of men to whom licenses were issued by virtue of their offices. This is partly due to the fact that those examined realize the responsibilities of their positions, while the others too frequently consider their position inviolable; and partly to the fact that the close contact of the applicants with the Department representatives creates a better understanding of the relations between operation by the applicant and supervision by the Department. Furthermore, the operator taking an examination has to study recent books on the subject and becomes acquainted with the latest developments. This studying does not end with the examination, as it has been found that men who prior to the examination did little or no reading whatever have now become subscribers to engineering and water works periodicals, and read them regularly with the beneficial results that always come with a wider scope of knowledge in a science that changes so rapidly. The desire for modern improve-

ments as a result of this type of reading is more common with the men examined than with the others.

These facts are not meant to indicate that the old operators are inefficient, as some of them are among the best in the country, but apply in general to the plants under 5,000,000 gallons daily capacity, where in many cases the salaries are too small to attract capable men.

At one filter that delivers 2,000,000 gallons daily capacity, running 24 hours, there were three men, each on an 8-hour shift, whose duties were to tend to alum and hypochlorite feeds, wash filters, fire the boilers, run a low-lift centrifugal and a high pressure reciprocating pump. The men were kept so busy that at times they were observed holding a sandwich in one hand while oiling the pumps with the other. If one were sick the others were forced to work 12 hours each. The plant was in a deplorable condition, and the water delivered was correspondingly poor (at that time complaints about the water were being made almost daily).

The Department threatened action unless a capable man was employed, and the town held up its hands in horror at the advice to pay at least \$2000 a year to a capable supervisor. Finally a compromise was made whereby a consulting operator was employed to visit the plant at frequent intervals, and to make such recommendations and changes as seemed necessary. While even now the water is not always of the best, the complaints are not numerous and the efficiency of the plant increased so that the results now obtainable are limited only by the facilities, which can not be readily improved without rebuilding at least a large part of the plant.

In no case has the Department actually asked for the dismissal of an operator on the grounds of incompetency, negligence or disobeying the law, but several hearings have been held by the Department giving offending municipalities or companies an opportunity to show cause why conditions at the given plant should not be improved or changed in accordance with orders previously issued. In one case the matter of incompetency of a plant operator, together with the continued refusal of the company, was referred to the Attorney General for procedure in the Court of Chancery. Upon learning of this the company hired a new and competent operator and made changes previously advised by the Department.

The act was passed more than three years ago, but due to the large amount of preliminary work involved the full effect was not in substantial operation until the middle of 1919, giving the practical operation a fair test for about one and one-half years. The efficiency in applying the law has increased with time, the difficulties inherent in a new system having been gradually overcome. Some of the applicants at first appeared to resent some of the conditions imposed, including the taking of an examination, but most of this resentment has disappeared, and the results appear to be beneficial. It is believed that the standards will continue to improve, and while the act and its conditions are not perfect its provisions are so broad that the defects are mainly those of the application of the law to the individual cases.

In conclusion it may be said that the results of the act are as follows:

1. It tends to remove the positions of operators of water treatment plants from the influence of politics.
2. It improves the working conditions of the operators and results in their last recommendations for needed improvements receiving more consideration by their employers.
3. There is less friction between the water departments and water companies and Department of Health; the operators are gradually getting away from the idea that the representatives of the Department are trying to get something on them, and are beginning to place their problems before the Department inspectors for investigation.
4. It aids in securing a safe water for potable purposes from each purification plant.

APPENDIX

CHAPTER 23, LAWS OF 1918, NEW JERSEY

An Act to provide for the examination and licensing of superintendents and operators in charge of water purification or treatment plants and sewage treatment plants under the direction of the Department of Health of the State of New Jersey.

BE IT ENACTED by the Senate and General Assembly of the State of New Jersey:

1. In order that municipalities, corporations or individuals owning or operating water purification or sewage disposal plants may secure the services of capable superintendents or operators, the Department of Health of the State of New Jersey is hereby authorized to cause examinations to be made, by such persons and at such times and places as it may appoint and under

such rules and regulations as it may adopt, for the purpose of determining the qualifications of applicants for licenses as superintendents or operators in charge of any water purification or treatment plants purifying or treating water used for potable purposes by this State or of any sewage treatment plants discharging an effluent into any of the waters of this State. Every such examination shall be in such subjects and conducted in such a manner as the Department of Health of the State of New Jersey shall direct, and every applicant whose examination shall be approved by said department shall receive a license as superintendent or operator of public water treatment plants or public sewage treatment plants, as the case may be.

2. No municipality, corporation or individual shall appoint any person as superintendent or operator in charge of any water purification or treatment plant purifying or treating water used for potable purposes by inhabitants of this State or of any sewage treatment plant discharging an effluent into any of the waters of this State, or permit any person to discharge the duties of superintendent or operator in charge of such plant who is not the holder of a license issued by the Department of Health of the State of New Jersey under the provisions of this act; *provided, however*, that nothing herein contained shall prevent any municipality, corporation or individual from continuing in office any person now occupying the office of superintendent or operator in charge of any water purification or treatment plant or any sewage treatment plant, and the Department of Health of the State of New Jersey, upon certification from the proper municipal officer, corporation or individual, that such person held the office of superintendent or operator in charge of such water purification or sewage treatment plant at the time this act became effective, shall issue a license to said person in the same manner as if he had passed an examination held by the aforesaid department.

3. The Department of Health of the State of New Jersey may revoke the license of any superintendent or operator in charge of any water treatment or sewage treatment plant if, after a hearing held by said department at which said superintendent or operator shall have had an opportunity to be heard, either in person or by counsel, said department shall determine that the said superintendent or operator in charge is incompetent to manage said plant, or that he has wilfully neglected his duty in supervising the operation of said plant, or that he has disregarded or disobeyed the lawful orders, rules or regulations of said department.

4. Any person who shall violate any of the provisions of this act shall be liable to a penalty of ten dollars for each day on which such violation has occurred. All penalties prescribed by this section shall be recovered in an action of debt by and in the name of the Department of Health of the State of New Jersey as plaintiff.

5. All penalties collected under the provisions of this act shall be paid into the treasury of the State of New Jersey.

6. Whenever any municipality, corporation or individual shall violate any of the provisions of this act, it shall be lawful for the Department of Health of the State of New Jersey either before or after the institution of proceedings for the collection of the penalty imposed by this act for such violation, to file a bill in the Court of Chancery, in the name of the State, at the relation

of such department, for an injunction to restrain such violation and for such other or further relief in the premises as the Court of Chancery shall deem proper, but the filing of such bill, or any of the proceedings thereon, shall not relieve any party to such proceedings from the penalty or penalties prescribed by this act for such violation.

7. All acts and parts of acts inconsistent with the provisions of this act are hereby repealed.

8. This act shall take effect immediately.

Approved February 9, 1918.